SIL'VESTROV, L.K., inzh.

Determining the basic parameters in freezing the soil in a mine shaft combined with mine drainage. Shakht.stroi. 8 no.12:14-16 D '64. (MIRA 18:1)

1. Moskovskiy institut radioelektroniki i gornoy elektromekhaniki.

ARIPOV, R.A.; GRISHIN, V.G.; SIL'VESTROV, L.V.; STREL'TSOV, V.N.

[Scattering of 7-8 Bev. π^--mesons on nucleons involving a large momentum transfer] Rasseianie π^--mezonov s energiei 7-8 Bev na nuklonakh s bol'shoi peredachei impul'sa. Dubna, Ob"edinennyi in-t iadernykh issledovanii, 1961. 5 p. (MIRA 14:10)

1. Fiziko-tekhnicheskiy institut AN Uzbekskoy SSR (for Aripov).
(Mesons--Scattering)

BANNIK, B.P.; GALPER, A.M.; GRISHIN, V.G.; KOTENKO, L.P.; KUZIN, L.A.; KUZNETSOV, Ye.P.; MERSON, G.I.; PODGORETSKIY, M.I.; SIL'VESTROV, L.V.

Elastic scattering of 2.8 and 6.8 BeV/c negative pions on carbon. Dubna, Izdatel'skii otdel Ob"edinennogo in-ta iadernykh issledovanii, 19[illegible]. 20 p.

(No subject heading)

BANNIK, B.P.; GRISHIN, V.G.; SIL'VESTROV, L.V.

Elastic scattering of 8.7 Bev. protons on photographic emulsion nuclei. Zhur. eksp. i teor. fiz. 40 no.6:1653-1657 Je '61. (MIRA 14:8)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Photography, Particle track)
(Protons—Scattering)

ARIPOV, R.A., sotrudnik; GRISHIN, V.G.; SIL'VESTROV, L.V.; STREL'TSOV, V.N.

Scattering of 7 -- 8 Bev π^- mesons on nucleons involving large momentum transfer. Zhur.eksp.i teor.fiz. 41 no.4:1330-1331 O '61. (MIRA 14:10)

1. Ob'yedinennyy institut yadernykh issledovaniy. 2. Fiziko-tekhnicheskiy institut AN Uzbekskoy SSR (for Aripov).
(Mesons- Scattering)

BANNIK, B.P.; GAL'PER, A.M.; GRISHIN, V.G.; KOTENKO, L.P.; KUZIN, L.A.; KUZNETSOV, Ye.P.; MERZON, G.I.; PODGORETSKIY, M.I.; SIL'VESTROV, L.V.

Elastic scattering of 2.8 and 6.8 Bev./c π^--mesons on carbon. Zhur. eksp. i teor. fiz. 41 no.5:1394-1401 N '61. (MIRA 14:12)

1. Ob"yedinennyy institut yadernykh issledovaniy i Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
(Mesons--Scattering) (Carbon)

ARIPOV, R.A.; GRISHIN, V.G.; SIL'VESTROV, L.V.; STREL'TSOV, V.N.; SARANTSEVA, V.R., tekhn. red.

[Charge-exchange in 7 to 8 Bev. π^- -mesons on protons] π^- -mezonov s energiei 7-8 Bev na protonakh. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 7 p. (MIRA 15:4)

1. Fiziko-tekhnicheskiy institut Akademii nauk Uzbekskoy SSR (for Aripov).
(Nuclear reactions) (Mesons) (Protons)

S/056/62/043/002/007/053
B102/B104

AUTHORS: Aripov, R. A., Grishin, V. G., Sil'vestrov, L. V., Strel'tsov, V. N.

TITLE: Charge exchange between π^- mesons with energies of 7-8 Bev and protons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 394-398

TEXT: π^-p charge exchange reactions of the type $\pi^- + p \rightarrow m\pi^0 + n$ ($m=1,2,3,\ldots$)(1) were analyzed in a 24-liter propane bubble chamber. Among 30,000 stereophotos, 376 events of type (1) were detected with an efficiency of 96%. The tracks were measured with an УИМ-21 (UIM-21) microscope, the calculations were made with an electronic computer of the OIYaI. m was found to be 2.8 ± 0.2 (the statistical theory of multiple production gives $m = 3$). Angular and energy distributions were measured for the γ-quanta (190 events) which form e^+e^- pairs and accompany the disappearance of π^- mesons. The angular distribution, which in the c.m.s. practically agrees with the π^0

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S/056/62/043/002/007/055
B102/B104

Charge exchange between π^- mesons ...

angular distribution, is anisotropic and has a sharp maximum in forward direction. The energy distribution in the laboratory system has a maximum for low energies and drops exponentially. The upper bound of the π^-p charge exchange cross section was estimated by three methods and found to be

$\sigma_{ex} \leqslant 0.1^{+0.25}_{-0.1}$ mb. The lower bound is given by $\sigma_{ex} \geqslant 0.07$. This value was obtained from the elastic $\pi^{\pm}p$ scattering cross sections. There are 2 figures.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research). Fiziko-tekhnicheskiy institut AN Uzbekskoy SSR (Physicotechnical Institute AS Uzbekskaya SSR) (R. A. Aripov)

SUBMITTED: March 2, 1962

Card 2/2

L 41602-65 EWT(m)/T/EWA(m)-2

ACCESSION NR: AP5007716 S/0367/65/001/001/0145/0147

15
13
B

AUTHOR: Azimov, M.A.; Pantuyev, V.S.; Sil'vestrov, L.V.; Khachaturyan, M.N. Chuvilo, I.V.

TITLE: Pion charge exchange cross section at 4 GeV/c

SOURCE: Yadernaya fizika, v. 1, no. 1, 1965, 145-147

TOPIC TAGS: pion proton charge exchange, pion high energy scattering, pion charge exchange cross section, Gamma spectrometer

ABSTRACT: Existing experimental data concerning the charge exchange π^- -scattering on hydrogen usually refer to the energy region below 2 GeV. In addition, such cross sections in the energy domain above 1 GeV are usually obtained using chambers, and they therefore represent only an estimate of the upper limit of the charge exchange cross section. Consequently, using the Cerenkov γ-spectrometer, the cross section for the negative pion charge exchange $\pi^- + p \rightarrow \pi^0 + n$ was measured at 4.1 GeV/c. The value of the cross section was found to be $\sigma_{exp} = 0.12 + 0.02$ mb. The article briefly describes the kinetics of the

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L 41602-65
ACCESSION NR: AP5007716

2

process, the geometry of the experiment, the equipment, and the calibration of the Cerenkov γ-spectrometer. "The authors thank M.I. Podgoretskiy for numerous consultations and constant interest in the work." Orig. art. has: 1 formula and 4 figures.

ASSOCIATION: Ob" yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Studies)

SUBMITTED: 01Sep64 ENCL: 00 SUB CODE: NP, OP

NO REF SOV: 001 OTHER: 000

Card 2/2 mc

L 21802-66 EWT(m)/T

ACC NR: AP6012191 SOURCE CODE: UR/0386/66/003/008/0336/0340

AUTHOR: Azimov, M. A.; Basova, Ye. N.; Gulyamov, U. G.; Iskanderdiyev, K. R.; Kolesnik, V. G.; Pantuyev, V. S.; Sil'vestrov, L. V.; Khachaturyan, M. N.

ORG: Joint Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy); Institute of Nuclear Physics, AN UzSSR, Tashkent (Institut yadernoy fiziki AN UzSSR)

TITLE: Differential cross section of charge exchange of 4.8-Gev/c π^- mesons with protons

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 8, 1966, 336-340

TOPIC TAGS: pion, charge exchange, differential cross section, spark chamber, Gamma radiation, meson, proton

ABSTRACT: The authors present preliminary results of the measurement of the differential cross section of the reaction $\pi^- + p \rightarrow n + \pi^0$ by a method described earlier (Preprint OIYaI, R-2436, Dubna, 1965), of detecting high-energy π^0 mesons with the aid of a spark chamber and a total-absorption Cerenkov counter. Unlike other methods, this method makes it possible to measure with good accuracy both the angle and the energy characteristics of γ quanta from π^0 meson decays. The

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setup was irradiated in a beam of 4.8-Gev/c π^- mesons from the OIYaI proton synchrotron. The measurements were made by a difference method using polyethylene and carbon targets. From the energy and angular distributions of the cases when two γ quanta were registered in the chamber the authors calculated the differential and total cross section of the reaction, with corrections evaluated for the following effects: (a) probability of conversion of two γ quanta in the lead converter, (b) probability of conversion of at least one of the γ quanta in the target or in the scintillation-counter material, (c) muon contamination of the beam, and (d) attenuation of the beam in the target. The averaged forward charge-exchange cross section was found to be 0.49 ± 0.1 mb/(Gev/c)^2, or 0.33 ± 0.07 mb/sr in units of solid angle (c.m.s.) (compared with 0.28 mb/sr from calculation based on the dispersion relations and the known data on the total cross sections of the π^+p and π^-p interactions. The total cross section of the reaction, calculated with account of the experimental geometry and published data on the differential charge-exchange cross section at large 4-momentum transfer is equal to 0.11 ± 0.02 mb.
The authors thank V. G. Grishin and M. I. Podgoretskiy for useful discussions, S. V. Mukhin, S. V. Rikhvitskiy, and I. N. Semenyushkin for the opportunity to use the pion channel, and I. V. Chuvilo, M. D. Shafranov, and I. M. Gramenitskiy for collaboration. Orig. art. has: 2 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 8Mar66/ ORIG REF: 002/ OTH REF: 004

VOLYNKIN, Yu.M.; YAZDOVSKIY, V.I.; GAZENKO, A.M.; VASIL'YEV, P.V.; GYURDZHIAN, A.A.; GUROVSKIY, N.N.; GORBOV, F.D.; SERYAPIN, A.D.; DELAY, V.Ye.; BAYEVSKIY, R.M.; ALTUKHOV, G.V.; KOPANEV, V.I.; KAS'YAN, I.I.; YEGOROV, A.D.; SILIVESTROV, M.M.; SHEPURA, S.F.; TERENT'YEV, V.G.; KRYLOV, Yu.V.; FOMIN, A.G.; USHAKOV, A.S.; DEGTYAREV, V.A.; VOLOVICH, V.G.; STEPANTSOV, V.I.; MYASNIKOV, V.I.; YAZDOVSKIY, V.I.; KASHIN, P.S., tekhn. red.

[First space flights of man; the scientific results of the medicobiological research conducted during the orbital flights of the spaceships "Vostok" and "Vostok-2"] Pervye kosmicheskie polety cheloveka; nauchny rezul'taty mediko-biologicheskikh issledovanii, provedennykh vo vremia orbital'nykh poletov korablei-sputnikov "Vostok" i "Vostok-2." Moskva, Izd-vo Akad. nauk SSSR, 1962. 202 p. (MIRA 15:11)
(SPACE MEDICINE) (SPACE FLIGHT TRAINING)

L 3899-65 EEC-4/EED-2/EWG(a)-2/EWG(c)/EWG(j)/EWG(r)/EEC(k)-2/EWG(v)/EWP(k)/EWT(d)/EWT(l)/EEC(t)/EWP(h)/FS(v)-3/EEC(c)-2/EWP(l)/FSS-2/EWP(v) Pb-4/Pe-5/Pf-4/Pn-4/Pp-4/Pq-4/Pac-4/Pae-2 AST

ACCESSION NR: AR4046575 S/0271/64/000/008/A077/A077

SOURCE: Ref. zh. Avtomat., telemekh. i vychisl. tekhn. Svodnyy tom, Abs. 8A509

AUTHOR: Denisov, V. G.; Yegorov, A. D.; Kuz'minov, A. P.; Sil'vestrov, M. M.; Soshin, B. A.

TITLE: Using biotelemetric data for investigation of the control systems of a man-operated cosmic ship

CITED SOURCE: Sb. Radiotelemetriya i fiziol. i med. Sverdlovsk, 1963, 121-124

TOPIC TAGS: telemetry communication, biometrics

TRANSLATION: Some psychological problems arising in the constructing of cosmic-ship control systems are considered. A parameter is suggested which would allow for the entire information on the psychophysiological condition of the operator and on the deviations of the controlled quantities set by the operator in the course of control; this parameter is proposed as an objective criterion for comparing various systems similar in their output data. Under random external disturbances, the "operator — ship" system has a certain degree of indeterminacy which permits evaluating the system conditions, viz., operator's organism

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L 43899-65

ACCESSION NR: AR4046575

condition and quality of control.Here the concept of entropy can be used for quantitative evaluation of the indeterminacy. In determining the generalized criterion, an overall entropy for the selected electrophysiological indices and the controlled-parameter-deviation performance is used which requires processing a great deal of information in a computer. Thus, in long cosmic flights at a long range from the Earth, the installation of a ship-borne computer for narrow-band telemetric transmitting bioinformation to the Earth's stations in the form of a generalized criterion becomes expedient.

SUB CODE: AS, SV ENCL: 00

Card 2/2 mb

ACCESSION NR: AT4037695 S/2865/64/003/000/0245/0249

AUTHOR: Kuz'minov, A. P.; Onishchenko, V. F.; Sil'vestrov, M. M.

TITLE: Retention of habits for transmitting information under conditions of prolonged isolation

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy* kosmicheskoy biologii, v. 3, 1964, 245-249

TOPIC TAGS: isolation, emotional stress, manned space flight

ABSTRACT: Experiments have been conducted to study the effects of prolonged isolation on the ability of man to perform habitual tasks involving the transmission of information. Data from five experiments on prolonged isolation indicate that during the first day, performance in the habitual transmission of information decreases both qualitatively and quantitatively. Adaptation to conditions of isolation usually takes place on the second or third day; performance improves, but does not reach the initial level. The average number of errors for a well-trained operator is higher under isolation conditions than under normal circumstances. The character and degree of emotional strain has been shown to vary with the individual peculiarities of each subject studied.

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ACCESSION NR: AT4037695

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: PH, LS

NO REF SOV: 006 OTHER: 005

Card 2/2

L 22591-65 EEO-2/EWG(j)/FSF(h)/EWG(r)/EWT(l)/EWP(m)/FS(v)-3/EEC(k)-2/EWG(v)/EWG(a)/EWG(c) Pd-1/Pe-5/Pi-4/Po-4/Pq-4/Pac-4/Pae-2 TT/DD/RD/GW

ACCESSION NR: AP4046782 S/0293/64/002/005/0783/0796

AUTHOR: Denisov, V. G.; Zav'yalov, Ye. S.; Kuz'minov, A. P.; Sil'vestrov, M. M.; Yazdovskiy, V. I. 61 B

TITLE: Problems of engineering psychology in cosmonautics and some results of investigations

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 5, 1964, 783-796

TOPIC TAGS: cosmonaut training, engineering psychology, biotelemetry, cybernetic measuring, closed ecological system, manned spaceflight

ABSTRACT: The authors discuss various problems of creating spaceship control systems and training of cosmonauts for prolonged spaceflights. Block diagrams are presented which reflect methods of evaluating closed operator-spaceship systems by means of cybernetics and information theory systems. These systems would yield engineering evaluations of spaceship operations and physiological records of the biopotentials of various functional systems of man. The physiological records would, in turn, reveal the level of psychological and physiological stresses as well as indicate the working capacity of the crew members. Some results of investigations in this field

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ACCESSION NR: AP4046782

are presented with special attention given to recording, signaling, and voice transmission control sytems. The use of complex functional and specialized training devices, including those which could be used on board spaceships, is discussed with the aim of maintaining the work habits of cosmonauts over the long periods of time which prolonged spaceflights would entail. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 28FEb64 ENCL: 00 SUB CODE: PH, LS

NO REF SOV: 006 OTHER: 003

Card 2/2

VOLYNKIN, Yu.M.; ARUTYUNOV, G.A.; ANTIFOV, V.V.; ALTUKHOV, G.V.; BAYEVSKIY, R.M.; BELAY, V.Ye.; BUYANOV, P.V.; BRYANOV, I.I.; VASIL'YEV, P.V.; VOLOVICH, V.G.; GAGARIN, Yu.A.; GENIN, A.M.; GORBOV, F.D.; GORSHKOV, A.I.; GUROVSKIY, N.N.; YESHANOV, N.Kh.; YEGOROV, A.D.; KARPOV, Ye.A.; KOVALEV, V.V.; KOLOSOV, V.A.; KORESHKOV, A.A.; KAS'YAN, I.I.; KOTOVSKAYA, A.R.; KALIBERDIN, G.V.; KOPANEV, V.I.; KUZ'MINOV, A.P.; KAKURIN, L.I.; KUDROVA, R.V.; LEBEDEV, V.I.; LEBEDEV, A.A.; LOBZIN, P.P.; MAKSIMOV, D.G.; MYASNIKOV, V.I.; MALYSHKIN, Ye.G.; NEUMYVAKIN, I.P.; ONISHCHENKO, V.F.; POPOV, I.G.; PORUCHIKOV, Ye.P.; SIL'VESTROV, M.M.; SERYAPIN, A.D.; SAKSONOV, P.P.; TERENT'YEV, V.G.; USHAKOV, A.S.; UDALOV, Yu.F.; FOMIN, V.S.; FOMIN, A.G.; KHLEBNIKOV, G.F.; YUGANOV, Ye.M.; YAZDOVSKIY, V.I.; KRICHAGIN, V.I.; AKULINICHEV, I.T.; SAVINICH, F.K.; STEPURA, S.F.; VOSKRESENSKIY, O.G.; GAZENKO, O.G., SISAKYAN, N.M., akademik, red.

[Second group space flight and some results of the Soviet astronauts' flights on "Vostok" ships; scientific results of medical and biological research conducted during the second group space flight] Vtoroi gruppovoi kosmicheskii polet i nekotorye itogi poletov sovetskikh kosmonavtov na korabliakh "Vostok"; nauchnye rezul'taty medikobiologicheskikh issledovanii, provedennykh vo vremia vtorogo gruppovogo kosmicheskogo poleta. Moskva, Nauka, 1965. 277 p. (MIRA 18:6)

L 2942[illegible]

ACC NR: AT6012890 SOURCE CODE: UR/0000/65/000/000/0112/0118

AUTHOR: Bulat, A. A.; Denisov, V. G.; Kuz'minov, A. P.; Onishchenko, V. F.; Rozanov, Yu. A.; Sil'vestrov, M. M.

ORG: None

TITLE: An integral method for evaluating the effective training level of operators in control systems

SOURCE: Sistema chelovek i avtomat (Man-automaton systems). Moscow, Izd-vo Nauka, 1965, 112-118

TOPIC TAGS: man machine communication, electrophysiology, specialized training, training procedure, human engineering

ABSTRACT: The authors consider the dynamics of the process by which an operator acquires skill in control and the degree to which training is effective in an attempt to solve the problem of adaptation of an operator to the system which he controls. Factors affecting the speed at which working habits are formed are discussed. It is pointed out that the purely psychological method for evaluating the level of training effectiveness is not sufficiently complete and objective. Electrophysiological methods are used for a fuller evaluation of the habit formation process using electroencephalograms, electromyograms, electrocardiograms, cutaneogalvanic reactions, and pneumograms to study changes in the neuropsychic makeup of the operator. The results of tests show a reduction in the bioelectric activity of the muscles and high-frequency

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L 29436-66

ACC NR: AT6012890

rhythms of the cerebral cortex as well as in the amplitude of electrocutaneous potentials and the number of cardiac contractions to a frequency close to the normal pulse rate. A diagram is given showing the equipment for comprehensive registration of the electrophysiological indices of the operator during training. An analysis of the dynamic process of coordination between the various systems in the organism of the operator during training is used for determining the instant when the operator reaches optimum capacity for dealing with control problems. It is found that the circulation of a definite quantity of information is required for maintaining a given control process. This quantity of information is evaluated for a closed control system with a single human link. An integral expression is given for evaluating the level of effectiveness of operator training in man-machine systems. A curve is given showing the degree of training effectiveness for an operator in a complex control system as a function of the number of training exercises. Seven parameters were used for evaluating training effectiveness. It was found that working habits were formed after 12—13 training periods. Orig. art. has: 2 figures and 5 formulas. [08]

SUB CODE: 05 / SUBM DATE: 02Aug65 / ORIG REF: 006/ ATD PRESS: 5010

Card 2/2

L 24267-66 EWT(1)/FS(v)-3 SCTB DD/RD

ACC NR: AT6003834 SOURCE CODE: UR/2865/65/004/000/0003/0009

AUTHOR: Gurovskiy, N. N.; Denisov, V. G.; Kuz'minov, A. P.; Sil'vestrov, M. M.

ORG: none

TITLE: Training devices for preparing cosmonauts for occupational activity in controlling spacecraft and their systems

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 3-9

TOPIC TAGS: cosmonaut training, space flight simulation, manned spacecraft, space physiology, spacecraft navigation, spacecraft control, space environment simulation, training equipment, spacecraft capsule

ABSTRACT: Training craft such as are used for actual flight schooling of aviators do not exist for training cosmonauts. Reliance must therefore be place on ground trainers, which must be able to simulate the conditions and factors of normal and emergency spaceflight situations and model the operation of spacecraft systems and the dynamics of flight.

A great variety of training devices are used. The general characteristics of such devices must be based on time and motion studies of cosmonaut

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activities, operation of various systems, definition of training objectives, and analysis of training programs and effectiveness of training devices.

All training devices fall into one of three groups: 1) those for physiological training to increase resistance or adaptation to extremal flight factors; 2) those for occupational training in flight operations; and 3) those which combine physiological with occupational training. The present article discusses various types of devices designed to provide training in spacecraft piloting and systems control.

Depending on the number of systems, flight stages, and flight tasks to be modeled, trainers may be classed as 1) universal, 2) complex, 3) specialized, or 4) functional.

Universal trainers (which may be dynamic or static) are complex devices which may be adjusted to simulate the characteristics of existing or projected spacecraft. The most important elements of a universal trainer are a cabin mockup, computer, instructor's control panel, night sky and earth simulators, program device, and recording apparatus. The cabin mockup may be designed to simulate flight conditions (temperature, noise, vibration, atmospheric gas composition, pressure, humidity, and convection) on the spacecraft.

L 14267-66

ACC NR: AT6003834

Complex trainers are designed to train all crew members in the details of their activities on a given type of ship at all stages of flight. The complex trainer used for Vostok pilots includes training for flight and for using systems monitoring manual attitude control, for Earth-ship communications, systems control, manual deorbiting procedures, and for various types of emergencies. All on-board equipment was simulated; the mockup cabin was identical with that of the actual ship. Such details as the alternation of day and night in orbital flight were reproduced. Training problems were imposed from the instructor's control panel outside the trainer. All phases of normal flight and emergencies in every flight stage were simulated on the Vostok trainer. The construction of complex trainers for multiman interplanetary and orbital spacecraft crews and pilots of orbital aircraft (rocket planes) is envisioned.

Specialized trainers are those designed to provide training in specific flight tasks or activities or the use of control equipment for specific maneuvers. Examples are devices for training cosmonauts in attitude control, navigation, changing orbits, rendezvous and docking operations, assembly and repair of space stations or spacecraft while in orbit, getting an inter-

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planetary vessel under way from a space station, and so on. Specialized trainers model only those systems and information sources entering into the performance of a specific flight task. A specialized trainer was used to prepare the crew of Voskhod-2 for EVA. Consisting of a cabin mockup with an airlock, which was placed in a vacuum chamber, it enabled Leonov and Belyayev to rehearse every detail of the EVA until it was second nature. Another example of a specialized trainer is the airlock flown on parabolic trajectories to provide training in egress and ingress procedures during weightlessness. Training devices carried on long spaceflights to keep space pilots from getting rusty in landing procedures are also classed as specialized trainers. On-board trainers are designed to make use of existing indicators, signals, manual controls, and the on-board computer.

Functional trainers are designed to provide practice in motor habits or other functional capacities utilized during more complex flight operations, e.g., tracking, concentration, perception, and other basic skills. It models only what is required to increase human functional capacity in one or another respect. Functional trainers are simple, cheap, and efficient. They are, therefore, well suited to types of training requiring many hours to establish

L 14267-66
ACC NR: AT6003834

or perfect the required habit patterns.

Theoretically it would be possible to build a combined trainer which would combine all the modeling capabilities of universal, complex, and specialized trainers, but this would be a prohibitively expensive proposition, and at present it is considered neither desirable nor necessary to do so. Universal-type trainers, which also attempt to model too wide a variety of characteristics and conditions, are unwieldy and inefficient.

The authors conclude that since cosmonauts are trained for specific ships and specific tasks on a given ship, three types of trainers are necessary and sufficient: complex, specialized, and functional. [ATD PRESS: 4091-F]

SUB CODE: 05, 22 / SUBM DATE: none / OTH REF: 001

PC
Card 5/5

ACC NR: AN6016713 (N) SOURCE CODE: UR/9008/66/000/131/0004/0004

AUTHOR: Sil'vestrov, M. (Candidate of technical sciences); Lityagin, V. (Engineer)

ORG: none

TITLE: Problems of spacecraft rendezvous and docking

SOURCE: Krasnaya zvezda, 08 Jun 66, p. 4, col. 1-4

TOPIC TAGS: spacecraft docking, space station, spacecraft rendezvous, spacecraft tracking, spacecraft control, space food, spacecraft carried equipment, spacecraft maneuver

ABSTRACT: According to Candidate of Technical Sciences M. Sil'vestrov and Engineer V. Lityagin, a space station must first be built on Earth, then disassembled, the parts put into a predetermined orbit, and then reassembled in space. Specialists feel that this can be accomplished, but it requires the organization of a complex ground tracking system and well-timed launching of reliably guided transport satellites and rockets. Topping the current list of problems to be solved is that of orbital rendezvous and docking. The first Soviet attempt at this was carried out in 1962 by A. Nikolayev and P. Popovich in the Vostok-3 and Vostok-4 spacecraft. The minimum distance between these two craft was about 5 km, and the inclination of their orbital planes did not coincide by only 2 minutes.

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ACC NR: AN6016713

The control of a vehicle's movement during flight is achieved by the use of special engines which serve to accelerate or decelerate the spacecraft as well as to counter disturbing forces. The main problem of a docking in space is the proper positioning of the vehicles during the last 300—500 meters of their approach, and the precise, "soft" coupling of the vehicles. This will be facilitated by on-board instrumentation. Maneuvering techniques are currently the greatest problem; however, there is no doubt that techniques for maneuvering in orbit will shortly become routine.

Biologists have estimated that approximately 275 kg of supplies monthly will be necessary to maintain a crew in a space station. In addition, fuel reserves for stabilizing a station in a certain attitude will be necessary. Specialists estimate that a total of 1275 kg of cargo will have to be delivered into orbit. If the station is to remain in orbit for several months or even years, its crew members will need to be relieved and additional equipment will have to be delivered to the station. The authors predict that the time will come when the assembly of a space station, the refuelling of a rocket in orbit, or the performing of other operations in space will become no more difficult than the refuelling of an aircraft in midair. [ATD PRESS: 5022-F]

SUB CODE: 22, 06 / SUBM DATE: none

Card 2/2 af

ACC NR: AT7011645 SOURCE CODE: UR/0000/66/000/006/0001/0007

AUTHOR: Rozanov, Yu. A.; Sil'vestrov, M. M.; Popov, V. A.

ORG: none

TITLE: Informational model of motion dynamics and space extravehicular orientation of astronauts

SOURCE: International Astronautical Congress. 17th, Madrid, 1966. Doklady. no. 7. 1966. Informatsionnaya model' dinamiki dvizheniya i prostranstvennaya oriyentirovka kosmonavta vne korablya, 1-7

TOPIC TAGS: individual maneuver, EVA, information model, astronaut orientation, spatial orientation, visual feedback, extravehicular movement, weightlessness

ABSTRACT:
Systems for individual maneuvering during extravehicular activity must include power units to provide angular and linear movement, angular velocity stabilization devices for stopping angular rotation, and information feedback to guide the astronaut in controlling his movements. Types of feedback information which are essential include: 1) information on the angular position of the body, relative to the "line-of-sight"

ACC NR: AT7011645

(astronaut-to-spacecraft) in yaw and pitch and relative to the spacecraft in roll; 2) angular velocity of the "line-of-sight", i.e., the lateral component of relative velocity; 3) speed of approach (or departure); and 4) relative distance. Ordinarily, under terrestrial conditions, much such feedback information comes from the statokinetic analyzers and from visual observation of surrounding objects; both these information sources are severely limited in space by the absence of gravity and of nearby visual reference points. Experimental studies were undertaken to discover which of these kinds of information should be emphasized in an informational model of spatial motion, and what sort of display should be utilized in such a system. It was found that relative distance and approach and departure speed were the most difficult control parameters to estimate visually (using changes in the apparent size of the object approached). Various methods of feedback (verbal cues from the spacecraft pilot, auditory signals, and visual information displays) were used to supplement visual estimation. Luminous lines painted on the spacecraft hull aid in perceiving its position and orientation when it is in shadow. Orig. art. has: 1 figure. [ATD PRESS: 5098-F]

Card 2/2 SUB CODE: 06,22 / SUBM DATE: none

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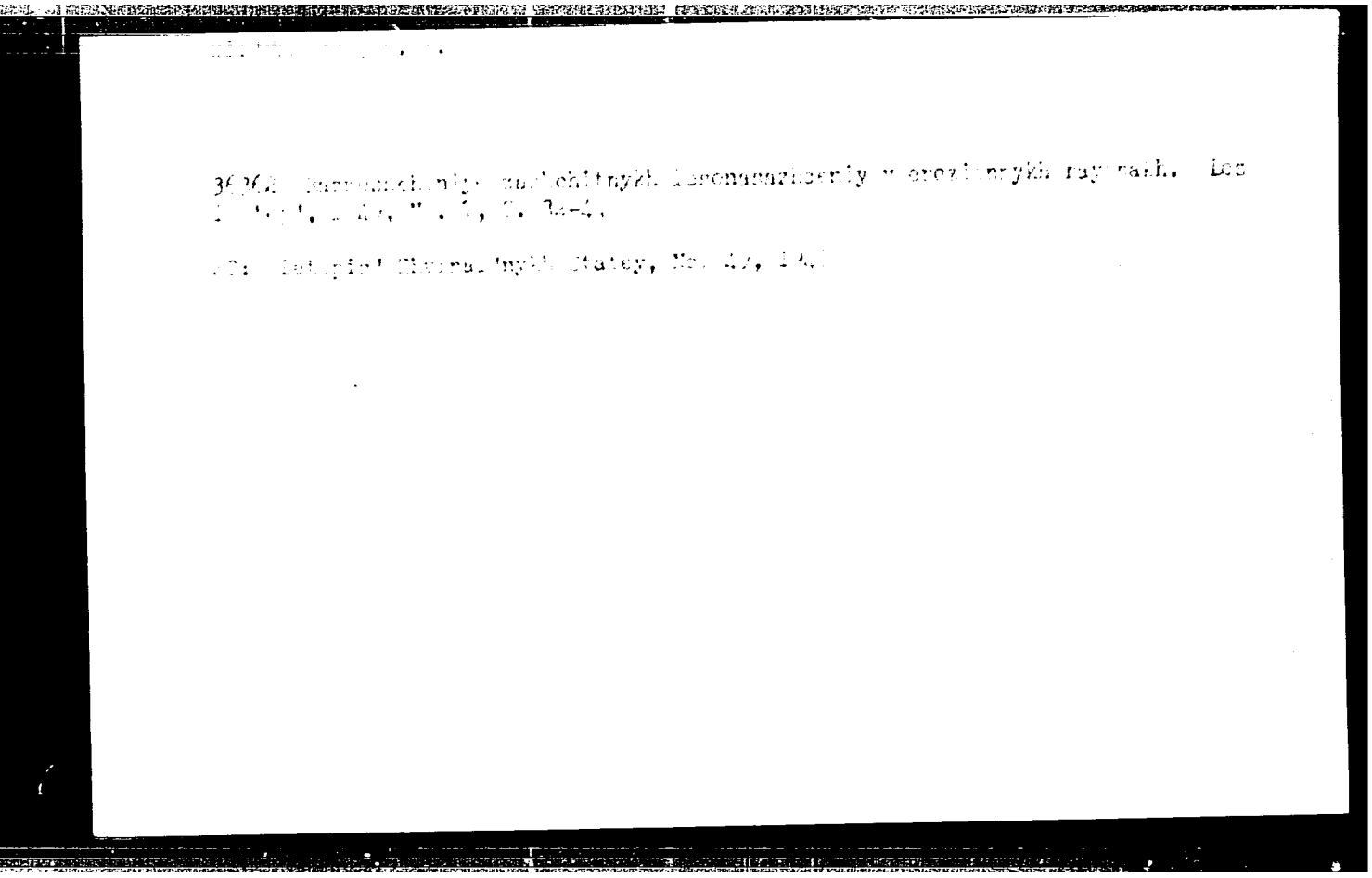

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2. USSR (600)

4. Afforestation

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SIL'VESTROV, S.I., kandidat sel'skokhozyaystvennykh nauk.

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(MLRA 10:3)
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1. Institut geografii AN SSSR.
(Land—Congresses)

SIL'VESTROV, S.I.

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1. Institut geografii AN SSSR.
(Erosion)

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LOBATIN, G. V., — "The intensity of water erosion on the territory of the USSR"

[redacted]CHEVYAKOV, Yuriy A., — "The influence of movement of the crust of the earth on erosion processes"

[redacted]NYAKOVA, Galina A., — "Soil erosion caused by the irregular flow of ground waters and methods of combatting it"

SILVESTROV, S. I. — "On the division of territories subject to erosion in the USSR"

SOKOLOV, Sergey S. "The principal types of soil erosion and the geographic distribution of erosion factors in the territory of the USSR"

reports to be submitted for the Intl. Association of Scientific Hydrology, Symposium on Continental Erosion, Bari, Italy 1-6 Oct 1962 sponsored by IUGG

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1. Institut geografii AN SSSR.

SIL'VESTROV, S.I.; LISICHEK, Ye.N.; MIRONOVA, Ye.A.; SOLINA, N.M.; ARMAND, D.L., doktor geogr. nauk, otv. red.

[Regionalization of the U.S.S.R. according to the basic factors of erosion] Raionirovanie territorii SSSR po osnovnym faktoram erozii. Moskva, Nauka, 1965. 233 p. (MIRA 18:6)

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GELLER, S.Yu.; GERASIMOV, I.P.; KAMANIN, L.G.; KES', A.S.; KINITSYN, L.F.; KURZAYEV, E.M.; NITSHTAUT, M.I.; NEFED'YEVA, Ye.A.; NIKOL'SKAYA, V.V.; PREOBRAZHENSKIY, V.S.; RIKHTER, G.D.; ROSSOLIMO, L.L.; SIL'VESTROV, S.I.

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SIL'VESTROV, B.N., inzh.

Experimental investigation by the method of equivalent materials of land subsidence in the construction of subway tunnels by artificial soil freezing. Sbor. trud. LIIZHT no.225:41-53 '64.

Land subsidence in escalator tunnel building by artificial soil freezing, and measures for reducing it. Ibid.:54-70 (MIRA 18:8)

82288

S/135/60/000/007/005/014
A006/A002

18.7200
18 8200

AUTHOR: Sil'vestrov, V.A., Engineer

TITLE: Fatigue Strength of AMr6 (AMg6) Alloy Weld Joints

PERIODICAL: Svarochnoye Proizvodstvo, 1960, No. 7, pp. 15-17

TEXT: At LIST investigations were made into the characteristics of static and cyclic strength of the basic types of weld joint in AMg6 alloys, produced by semi-automatic argon-arc welding. Specimens were made of 5, 10 and 20 mm thick hot-rolled sheet metal. Their chemical composition and mechanical properties are given in Table 1. The author studied the thermal effect of welding on the base metal of specimens with and without fillet welds and investigated the strength of overlap and T-joints in 17 test series with 180 specimens. Argon arc welding was performed with an AMg6 wire of 2 mm in diameter on a ПШП-9 (PShP-9) semi-automatic machine. The specimens were tested by alternating tension with a coefficient of asymmetry of the cycle r = 0.1, and a test basis of 5 million cycles. Loading was performed on a universal hydropulsation ГРМ-1 (GRM-1) machine with a pulse frequency of 600 cycles per minute. The machine produces alternating loads ranging from 0.5 to 25 tons. The tests yielded the following

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A006/A002

Patigue Strength of 6 (AM66) Alloy Weld Joints

results: Under cyclic loads the strength of weld joints is lower than that of the base metal, due to the concentration of stresses depending on the shape of the connection and the seam. The strength of butt-welded specimens where the protruding convex part of the weld was subsequently removed, is by 20% lower than that of the base metal. The temperature effect of welding on the metal does almost not reduce its cyclic strength. At a thickness of 20 mm of the metal being welded, the X-shaped beveling of edges is unfit for semiautomatic welding, since a complete fusion of the seam root is not attained. An increase in the welding current in this case entails overheating of the metal. In fillet welds, least cyclic strength is observed in the longitudinal fillet welds due to the concentration of stresses inevitable in such type of connection. Static tests show that the strength of butt welds attains to 85-95% that of the base metal. Removing the protruding convex part of the weld under static load does not raise the strength of the joint. A comparison of the static strength of transverse and longitudinal fillet welds shows similar values and sometimes higher strength of the longitudinal fillet welds. In all the specimens, multilayer seams have a lower strength than single-layer seams. The static strength of built-up metal determined on Gagarin specimens, is by 7-9% below that of the unannealed electrode wire. This is probably due to the burning out of magnesium. Tests limited by the coefficient

Card 2/3

SILVESTROV, V.D. DECCEASED 1961/3

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SEE ILC

INSTRUMENT CUTTING

[redacted], V.F.,

"Comparative Characteristics of the Basic Hemodynamic Indexes in Primary and Symptomatic Hypotension," P. 52 Military Medicine 1956

lecture delivered at a conference of Soviet military physicians at the Military Medical Academy im. S.M. Kirov, Leningrad, 29-October - 2 Nov 56.

SIL'VESTROV, V.P. (Leningrad)

Ol'ga Pavlovna Leont'eva. Med.sestra 15 no.5:31 My '56. (MLRA 9:8)
(LEONT'EVA, OL'GA PAVLOVNA, 1893-)

SIL'VESTROV, V.P., kandidat meditsinskikh nauk

Vascular reflexes in arterial hypotension. Terap.arkh. 28 no.2: 9-18 '56. (MLRA 9:7)

1. Iz kafedry gospital'noy terapii (nach. - chlen-korrespondent AMN SSSR prof. M.S.Molchanov) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.

(HYPOTENSION, physiology,
vasc. reflexes (Rus))
(REFLEX,
vasc. in hypotension (Rus))

SIL'VESTROV, V.P., kandidat meditsinskikh nauk

Changes in the higher nervous activity in certain forms of arterial hypotension. Terap.arkh. 28 no.6:76-84 '56. (MLRA 9:11)

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(HYPOTENSION, physiology,
conditioned reflex plethysmographic variations (Rus))
(PLETHYSMOGRAPHY, in various diseases,
hypotension, conditioned reflex changes (Rus))
(REFLEX, CONDITIONED,
plethysmographic conditioned changes in hypotension
(Rus))

SIL'VESTROV, V.P., kandidat meditsinskikh nauk (Leningrad)

Hemodynamic indices in arterial hypotension. Klin.med. 34 no.9: 62-68 S '56. (MLRA 9:11)

1. Iz kafedry gospital'noy terapii (nach. - chlen-korrespondent AMN SSSR prof. N.S.Molchanov) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.

(HYPOTENSION, physiol.
hymodynamic indices)
(BLOOD CIRCULATION, physiol.
hemodynamic indices in hypotension)

SIL'VESTROV, V.P. (Leningrad)

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1. Kafedra gospital'noy terapii (nach.-chlen-korr. AMN SSSR, prof., general-mayor meditsinskoy sluzhby M.S.Molchanov) Voyenno-meditsinskoy akademii.
(HYPOTENSION)

SIL'VESTROV, V.P., kand.med.nauk

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(HYPOTENSION, therapy,
(Rus))

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(CARDIOVASCULAR SYSTEM) (HYPOTENSION)

RAPOPORT, M.Yu., prof., SIL'VESTROV, V.P., kand.med.nauk, PUSHKAREV, A.D., kand.med.nauk (Leningrad)

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(HYPOTENSION, ther.
hypnosis (Rus))
(HYPNOSIS, ther. use
hypotension (Rus))

SIL'VESTROV, Vladimir Petrovich

[Bronchial asthma] Bronkhial'naia astma. Leningrad, Medgiz, 1960. (MIRA 14:7)
43 p.

(ASTHMA)

SIL'VESTROV, V.P.; YAROSLAVTSEV, A.L.

Determination of levomycetin in biological liquids by a chemical method. Lab. delo 6 no.4:20-23 Jl-Ag '60. (MIRA 13:12)

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(CHLOROMYCETIN)

SIL'VESTROV, V.P.; YAROSLAVTSEV, A.L.; MALOV, Yu.S. (Leningrad)

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(CHLOROMYCETIN)

KONSTANTINOV, Mikhail Vasil'yevich; SIL'VESTROV, V.P., red.; KHARASH, G.A., tekhn. red.

[Metabolic diseases] Bolezni obmena veshchestv. Leningrad, Medgiz, 1961. 41 p. (MIRA 15:3)
(METABOLISM, DISORDERS OF)

VAIL', Solomon Samuilovich; SIL'VESTROV, V.P., red.; CHUNAYEVA, Z.V., tekhn. red.

[Errors of clinical diagnosis; some of the most important internal diseases]Oshibki klinicheskoi diagnostiki; nekotorye vazhneishie vnutrennie bolezni. Leningrad, Medgiz, 1961. 202 p. (MIRA 15:10)

(DIAGNOSIS) (MEDICINE, INTERNAL)

SIL'VESTROV, V.P.; MALOV, Yu.S.

Use of levomycetin in the treatment of protracted pneumonia. Kaz. med. zhur. no.4:31-35 Jl-Ag '61. (MIRA 15:2)

1. Kafedra gospital'noy terapii No.1 (nachal'nik - prof. N.S.Molchanov) Voyenno-meditsinskoy ordena Lenina Akademii imeni S.M.Kirova.
(CHLOROMYCETIN) (PNEUMONIA)

SIL'VERSTROV, V.P.; MALOV, Yu.S.

Levomycetin concentration in the blood in treatment of some diseases of the internal organs. Lab.delo 7 no.11:24-27 N '61. (MIRA 14:10)

1. Kafedra gospital'noy terapii No.1 Voyenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova.
(LEVOMYCETIN--THERAPEUTIC USE)

SIL'VESTROV, V.P.; YAROSLAVTSEV, A.L. [deceased]

Levomycetin in the treatment of cholecystitis and cholangitis. (MIRA 15:1)
Sov. med. 25 no.7:81-86 Jl '61.

1. Iz kafedry gospital'noy terapii No.1 (nachal'nik - chlen-korrespondent AMN SSSR prof. N.A.Molchanov) i kafedry biokhimii (nachal'nik - chlen-korrespondent AMN SSSR prof. G.Ye.Vladimirov) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.
(LEVOMYCETIN) (GALL BLADDER--DISEASES)
(BILE DUCTS--DISEASES)

SIL'VESTROV, V.P.; SMIRNOVA, Z.A.

Errors in the diagnosis and treatment of some complications of antibacterial therapy. Kaz.med.zhur. no.4:22-27 Jl-Ag '62. (MIRA 15:8)

1. Kafedra gospital'noy terapii (nachal'nik - deystvitel'nyy chlen AMN SSSR, prof. N.S.Molchanov) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova i Leningradskaya oblastnaya klinicheskaya bol'nitsa (glavnyy vrach - A.P.Yegorova).
(ANTIBIOTICS--TOXICOLOGY)

a, nr L 9793-66

ACC NR: AP5028539 SOURCE CODE: UR/0286/65/000/020/0140/0140

AUTHORS: Garber, V. M.; Kerbaliyev, A. I.; Kozak, M. M.; Matskin, L. A.; Petrov, V. P.; Rudoy, Yu. M.; Sil'verstrov, V. T.

ORG: none

TITLE: Automatic machine for packaging liquid products in cans with inserted or rolled lids. Class 81, No. 175867

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 140

TOPIC TAGS: automation, storage device, lubricant

ABSTRACT: This Author Certificate presents an automatic machine for packaging liquid products in cans with inserted or rolled lids (for example, oils and lubricants), consisting of mechanisms for transporting and transferring cans, metering and filling of cans, interlocking and automation of the operations. To improve production, decrease working area, and eliminate individual drives for each automated transporting or synchronizing device, the machine is constructed as a single unit (see Fig. 1) with provisions for rolling or inserting lids from a lid bin, a labelling device with label magazine, and a common automated drive.

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L 1793-66

ACC NR: AP5028539

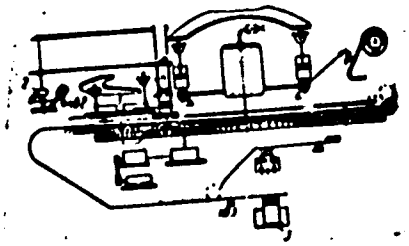
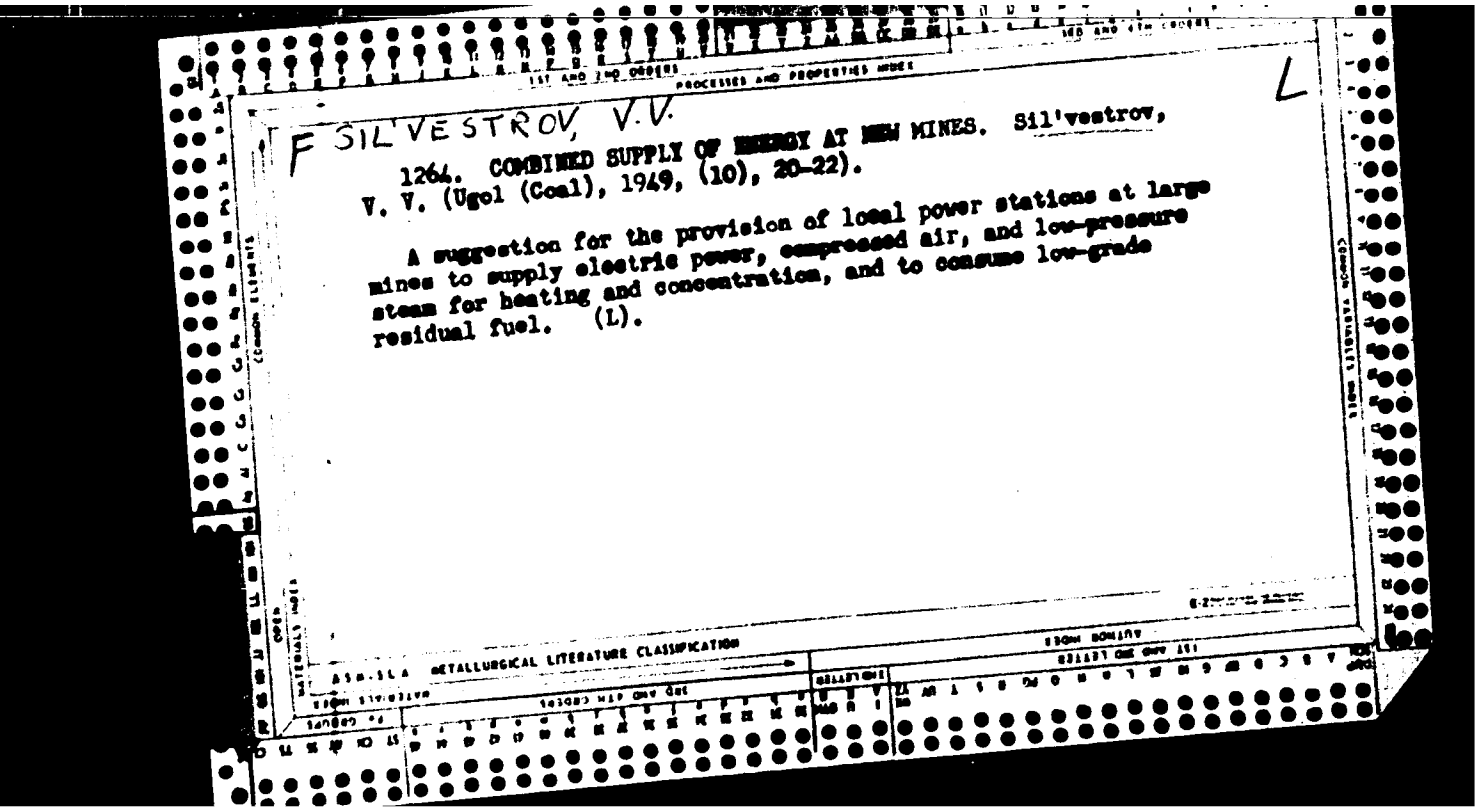


Fig. 1. 1 - Device for rolling or inserting lids; 2 - magazine; 3 - labelling device.

Orig. art. has: 1 figure.

SUB CODE: 13/ SUBM DATE: 19Mar62/

Card 2/2



F SIL'VESTROV, V.V.

L

1264. COMBINED SUPPLY OF ENERGY AT NEW MINES. Sil'vestrov, V. V. (Ugol (Coal), 1949, (10), 20-22).

A suggestion for the provision of local power stations at large mines to supply electric power, compressed air, and low-pressure steam for heating and concentration, and to consume low-grade residual fuel. (L).

SIL'VESTROV, V.V.

Kuznetsk Basin State Institute for the Design and Planning of Coal Mine Building. Shakht.stroi. no.11:31-40 N '57. (MIRA 10:12)

(Kuznetsk Basin--Research, Industrial) (Coal mines and mining)

ZARANKIN, N.Ye.; SIL'VESTROV, V.V.

Improving the technical and economic indices of Kuznetsk Basin coal enterprises. Izv. vys. ucheb. zav.; gor. zhur. no.8:53-59 '61. (MIRA 15:5)

1. Direktor Gosudarstvennogo inzhenerno-proyektnogo instituta po proyektirovaniyu shakhtnogo stroitel'stva v Kuzbasse (for Zarankin). 2. Glavnyy inzh. proyektov Gosudarstvennogo inzhenerno-proyektnogo instituta po proyektirovaniyu shakhtnogo stroitel'stva v Kuzbasse (for Sil'vestrov). Rekomendovana kafedroy gornoy ekonomiki organizatsii proizvodstva Sverdlovskogo gornogo instituta.

(Kuznetsk Basin--Coal mines and mining)

SOV/70-3-1-9/26

AUTHORS: Sil'vestrova, I.M. and Sil'vestrov, Yu.N.

TITLE: A Device for the Measurement of Pyro-electric Polarization of Crystals (Pribor dlya izmereniya piroelektricheskoy polyarizatsii kristallov)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 57 - 63 (USSR)

ABSTRACT: The pyro-electric effect is the change in polarization of a crystal with temperature. It is observed in crystals which have special polar directions. A static method for the measurement of the pyro-electric effect has been described by Ackermann (Ref 1). Up to the present time, there have been no measurements on the pyro-electric effect in which the rate of change of the temperature of the specimen was taken into account. The only exception is the paper by Nakamura (Ref 2) in which data are given on the changes in the pyro-electric polarization of Rochelle salt as a function of the rate of change of temperature of the specimen. However, it is very difficult to extract from that paper significant information on the effect of the rate of change of temperature on the magnitude of the pyro-electric constant since different rates of heating were used at different temperatures. In the present paper

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A Device for the Measurement of Pyro-electric Polarization of Crystals

a description is given of an apparatus which may be used to measure the charge on small capacitors of the order of a few μμF. The instrument has a time constant of the order of 30-40 min. The instrument is based on the transformation of a constant potential into an alternating potential with a subsequent amplification of the latter by a narrow-band amplifier. The input section of the instrument is shown in Figure 1. The principle is as follows: a potential $V_1 \sin \Omega t$ is applied to the capacitor C_1 which consists of a fixed electrode 1 and a membrane 2. The alternating potential is applied from the oscillator 5. This potential produces a ponderomotive force F, which is given by:

$$F = \frac{aV_1^2 \sin^2 \omega t}{8d_1^2} \qquad (2)$$

where a is the radius of the membrane, d_1 is the distance between the fixed plate and the membrane. Under the action of F the membrane executes oscillations with a

A Device for the Measurement of Pyro-electric Polarization of Crystals

frequency of 2ω with a mean displacement given by Eq (3), in which θ is the damping coefficient, J_o and J_2 are Bessel functions and μ is a frequency parameter equal to $\omega a/c$ (c is the velocity of sound in the membrane). If, in addition to $V_1 \sin \omega t$ a constant voltage V_o is applied from the crystal 4, then the force acting upon the membrane 2 is of the form:

$$F = \frac{a^2}{8d_1^2}\left(V_o^2 + \frac{V_1^2}{2} + 2V_1V_o \sin \omega_o t - \frac{V_1^2}{2} \cos 2\omega_o t\right) \quad (4).$$

Under the action of this force, the membrane will execute vibrations with a frequency ω_o (the first natural frequency) and a frequency of $2\omega_o$. When the frequency of the force is equal to one of the natural frequencies of the membrane, then $J_o(\mu) = 0$. In that case the mean

A Device for the Measurement of Pyro-electric Polarization of Crystals

value of the displacement of the membrane is given by Eq (5). The membrane 2 is at the same time also a part of the capacitor C_2, the other part of which is a fixed electrode 3. When the membrane vibrates, the capacitance of C_2 will change by a quantity $\Delta C = C_2\eta/d_2$. A potential equal to i_oR_2 is applied to C_2 through the resistance R_1. This potential is produced by the anode current flowing through the valve Π_1. When the capacitance C_2 changes, a charge-discharge current i flows through R_1 and R_2. The potential V_g, which appears when the current i flows through the resistance R_1, is applied to the grid of the valve and is amplified. The signal at the terminal 6 is given by:

A Device for the Measurement of Pyro-electric Polarization of Crystals

$$V_2 = \frac{i_o R_2 \bar{\eta}}{d_2} \cdot \frac{\mu R_2}{R_i + R_2 + \mu R_2} \qquad (6)$$

in which μ is the amplification coefficient of the valve. It is clear from Eqs (5) and (6) that if the valve Π_1 is followed by a filter which will pass a signal at a frequency ω_o but not at $2\omega_o$, then the potential difference of the output of such a device will be proportional to V_o.

In the instrument described, the membrane was of dumalumin, 9 mm in radius with a natural frequency of 960 c.p.s. and $\vartheta = 0.196$. The mean displacements of the membrane were 0.44×10^{-9} cm and 0.36×10^{-9} cm at ω_o and $2\omega_o$, respectively. The complete circuit diagram of the instrument is shown in Figure 2. The scheme can be used to measure voltages of the order of 25×10^{-3} V with an input capacity of 70.6 μμF. The time constant is limited by the insulation of the instrument. In the instrument now

A Device for the Measurement of Pyro-electric Polarization of Crystals

described, the specific resistance of the insulator was 10^{16} Ωcm. The instrument was used to measure the pyro-electric constant of tourmaline and ethylene diamine tartrate. Crystalline plates were placed in a crystal holder made of teflon; these were placed in an air thermostat with a dryer and a water jacket. The temperature in the thermostat was kept constant to within ± 0.01 °C. The temperature was measured by means of a low inertia semiconductor microthermometer of type MT-52. It was found that the pyro-electric constant of tourmaline was between 1.26 and 1.28 CGSE/cm^2 per degree when the temperature varied by 0.1, 0.2 and 0.3 °C, from the temperature of 20.6 °C. The average value for ethylene diamine tartrate at the same temperature was 2.52 CGSE/cm^2 per degree. Academician A.V. Shubnikov is thanked for his interest and encouragement.

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SOV/70-3-1-9/26

A Device for the Measurement of Pyro-electric Polarization of Crystals

There are 4 figures and 4 references, 2 of which are Soviet (1 translated from English), 1 English and 1 German.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc.USSR)

SUBMITTED: December 19, 1956

Card 7/7

SIL'VESTROVA, I.M.

Brief review of reports on the electric properties of corundum. (MLRA 7:5)
Trudy Inst.kriet.no.8:41-42 '53.
(Corundum) (Electric conductivity)

SIL'VESTROVA, I.M.

Determination of the modulus of elasticity of white sapphire. (MLRA 7:5)
Trudy Inst.krist. no.8:283-292 '53.
(Corundum) (Elastic solids)

SHUBNIKOV, A.V., akademik; ZHELUDEV, I.S.; KONSTANTINOVA, V.P.; SIL'VESTROVA, I.M.; TOLKACHEV, S.S., redaktor; ARONS, R.A. tekhnicheskiy redaktor.

[Research on piezoelectric crystal patterns] Issledovanie p'ezoelektricheskikh tekstur. Moskva, Izd-vo Akademii nauk SSSR, 1955. 188 p. (MLRA 8:9)
(Piezoelectricity)

SIL'VESTROVA, I.M.

Thermoelastic strains in anisotropic plates. V. L. Indenbom, I. M. Sil'vestrova, and Yu. I. Sirotin (Inst. Cryst., Acad. Sci. U.S.S.R., and M. V. Lomonosov State Univ., Moscow). *Kristallografiya* 1, 600–603 (1956).—Expressions are tabulated for calcg. the strains produced in crystals of various systems when plates are subjected to a temp. gradient normal to their surfaces. A. L. Mackay

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70-2-22/24

AUTHOR: Sil'vestrova, I.M.

TITLE: Determination of the coefficients of thermal conductivity of crystals of ethylene diamine tartrate. (Opredeleniye koeffitsientov temperaturoprovodnosti kristallov vinnokislogo etilendiamina)

PERIODICAL: "Kristallografiya" (Crystallography), 1957, Vol.2, No.2, pp. 304-307 (U.S.S.R.)

ABSTRACT: A non-stationary state method of measuring the thermal conductivities of crystals due to V.P. Zhuze and A.R. Regel' (Zh. Tekh. Fiz., 21, No.8, 1376-84, (1952)) is described. The crystal specimen was cut in the form of a cylinder about 5.5 to 18 mm high and of cross-sectional area about 100 mm^2. It was placed in a constant temperature enclosure on a heavy copper cylinder at 25 C and when equilibrium had been reached was transferred very rapidly to the top of another copper cylinder maintained at 50 C. The temperature of the upper surface of the specimen was recorded continuously with a thermocouple having its cold junction at 25 C. Glycerine was used to ensure good thermal contact. The voltage from the thermocouple was chopped and amplified. The method of calculation has already been described (Zh.Tekh. Fiz., 21, No.8, 1382-4, (1952)). The coefficients found were

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70-2-22/24

Determination of the coefficients of thermal conductivity of crystals of ethylene diamine tartrate. (Cont.)

$a_{11} = 3.2 \times 10^{-3} cm^2/sec$, $a_{22} = 2.7 \times 10^{-3}$, $a_{33} = 1.8 \times 10^{-3}$ and $a_{13} = 0.93 \times 10^{-3}$. The accuracy was 5-10%.

There are 3 figures, 4 references, 3 of which are Slavic.

Card 2/2 Acknowledgments to Acad. A.V. Shubnikov and V.L. Indenbom.

ASSOCIATION: Institute of Crystallography (Institut Kristallografiya AN SSSR)

SUBMITTED: February 1, 1957.

AVAILABLE: Library of Congress

70-5-29/31

AUTHORS: Chumakov, A.A., Sil'vestrova, I.M. and Aleksandrov, K.S.

TITLE: The Dielectric, Elastic and Piezo-electric Properties of Single Crystals of Benzophenone (Dielektricheskiye uprugiye i p'yezoelektricheskiye svoystva monokristallov benzofenona)

PERIODICAL: Kristallografiya, 1957, vol.2, No.5, pp. 707-709 (USSR).

ABSTRACT: Of the four modifications of crystalline benzophenone $(C_6H_5)_2CO$ the one studied was the stable orthorhombic one belonging to the symmetry group V_h^{24}. The specimens were made from large crystals (200-300 cm^3) prepared from acetone or carbon tetrachloride solution. The material had a density of 1.219 g/cm^3 at 20 °C and a m.p. of 47.0°. Dielectric constant measurements were made at 10^3 and 10^6 c/s and at a field strength of 5-10 V/cm.

$\varepsilon_{11} = 4.0 \pm 0.05$, $\varepsilon_{22} = 4.1 \pm 0.05$, $\varepsilon_{33} = 3.7 \pm 0.05$

$\tan\delta = (6 \pm 0.5) \times 10^{-4}$.

The dielectric strengths (in kV/mm) were found to be :

$E_x = 28 \div 30 \pm 3$, $E_y = 22 \div 25 \pm 3$, $E_z = 40 \div 50 \pm 4$

The elastic moduli were found to be (in 10^{10} dynes/cm^2)

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Dielectric, Elastic and Piezo-electric Properties of Single [illegible] of Benzophenone.

$c_{11} = 10.70 \pm 0.15$ $\quad c_{22} = 10.60 \pm 0.15$

$c_{33} = 7.10 \pm 0.04$ $\quad c_{44} = 2.03 \pm 0.01$

$c_{55} = 1.55 \pm 0.01$ $\quad c_{66} = 3.53 \pm 0.03$

$c_{23} = 3.21 \pm 0.13$ $\quad c_{31} = 1.69 \pm 0.08$

$c_{12} = 5.50 \pm 0.20$

Resonance and anti-resonance frequencies were measured for three [illegible] and the piezo-moduli were calculated from:

$$d_{ik} = \frac{\pi}{2} \frac{1}{f_R l} \left(\frac{\varepsilon_{ik} \Delta f}{4\pi \rho f_R} \right)^{1/2}$$

where f_R = resonance frequency, $\Delta f = f_a - f_R$ (f_a = anti-resonance frequency), ε_{ik} = dielectric susc., l = length, ρ = density,

[illegible]/4

70-5-29/31

The Dielectric, Elastic and Piezo-electric Properties of Single Crystals of Benzophenone.

$$d_{14} = 3.7 \pm 0.1 \times 10^{-7} \text{ c.g.s. units}$$
$$d_{25} = 0.6 \pm 0.02$$
$$d_{36} = 6.1 \pm 0.1 .$$

The coefficients of electromechanical coupling K were calculated from:

$$k = \frac{\pi}{2}\left(\Delta f / f_R\right)^{1/2}$$

as $k_{XY\ t_{45^\circ}} = 7.5\%$

$k_{YX\ t_{45^\circ}} = 3.8\%$

$k_{ZX\ t_{45^\circ}} = 16.0\%$.

$XY^{t}{}_{45^\circ}$ = X perpendicular to slice, length at 45° to Y and Z and electrodes on face perp. to X.

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70-5-29/31

The Dielectric, Elastic and Piezo-electric Properties of Single Crystals of Benzophenone.

The high value of k_{ZX} t_{45}^{o} contradicts Mason's view ("Piezoelectric Crystals and Their Applications in Ultrasonics", Russ. ed. 1952).
Benzophenone is recommended as useful material for piezo-electric applications at moderate temperatures.
Acknowledgments to Academician A.V. Shubnikov.
There are 2 figures and 3 Slavic references.

ASSOCIATION: Institute of Crystallography Ac.Sc. USSR.
(Institut Kristallografii AN SSSR)

SUBMITTED: February 9, 1957.
AVAILABLE: Library of Congress.

Card 1/1

SOV/70-3-1-9/26

AUTHORS: Sil'vestrova, I.M. and Sil'vestrov, Yu.N.

TITLE: A Device for the Measurement of Pyro-electric Polarization of Crystals (Pribor dlya izmereniya piroelektricheskoy polyarizatsii kristallov)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 1, pp 57 - 63 (USSR)

ABSTRACT: The pyro-electric effect is the change in polarization of a crystal with temperature. It is observed in crystals which have special polar directions. A static method for the measurement of the pyro-electric effect has been described by Ackermann (Ref 1). Up to the present time, there have been no measurements on the pyro-electric effect in which the rate of change of the temperature of the specimen was taken into account. The only exception is the paper by Nakamura (Ref 2) in which data are given on the changes in the pyro-electric polarization of Rochelle salt as a function of the rate of change of temperature of the specimen. However, it is very difficult to extract from that paper significant information on the effect of the rate of change of temperature on the magnitude of the pyro-electric constant since different rates of heating were used at different temperatures. In the present paper

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A Device for the Measurement of Pyro-electric Polarization of Crystals

a description is given of an apparatus which may be used to measure the charge on small capacitors of the order of a few μμF. The instrument has a time constant of the order of 30-40 min. The instrument is based on the transformation of a constant potential into an alternating potential with a subsequent amplification of the latter by a narrow-band amplifier. The input section of the instrument is shown in Figure 1. The principle is as follows: a potential $V_1 \sin \Omega t$ is applied to the capacitor C_1 which consists of a fixed electrode 1 and a membrane 2. The alternating potential is applied from the oscillator 5. This potential produces a ponderomotive force F, which is given by:

$$F = \frac{aV_1^2 \sin^2 \omega t}{8d_1^2} \qquad (2)$$

where a is the radius of the membrane, d_1 is the distance between the fixed plate and the membrane. Under the action of F the membrane executes oscillations with a

A Device for the Measurement of Pyro-electric Polarization of Crystals

frequency of 2ω with a mean displacement given by Eq (3), in which θ is the damping coefficient, J_o and J_2 are Bessel functions and μ is a frequency parameter equal to $\omega a/c$ (c is the velocity of sound in the membrane). If, in addition to $V_1 \sin \omega t$ a constant voltage V_o is applied from the crystal 4, then the force acting upon the membrane 2 is of the form:

$$F = \frac{a^2}{8d_1^2}\left(V_o^2 + \frac{V_1^2}{2} + 2V_1V_o \sin \omega t - \frac{V_1^2}{2} \cos 2\omega_o t\right) \qquad (4) .$$

Under the action of this force, the membrane will execute vibrations with a frequency ω_o (the first natural frequency) and a frequency of $2\omega_o$. When the frequency of the force is equal to one of the natural frequencies of the membrane, then $J_o(\mu) = 0$. In that case the mean

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A Device for the Measurement of Pyro-electric Polarization of Crystals

value of the displacement of the membrane is given by Eq (5). The membrane 2 is at the same time also a part of the capacitor C_2, the other part of which is a fixed electrode 3. When the membrane vibrates, the capacitance of C_2 will change by a quantity $\Delta C = C_2\eta/d_2$. A potential equal to i_oR_2 is applied to C_2 through the resistance R_1. This potential is produced by the anode current flowing through the valve $Л_1$. When the capacitance C_2 changes, a charge-discharge current i flows through R_1 and R_2. The potential V_g, which appears when the current i flows through the resistance R_1, is applied to the grid of the valve and is amplified. The signal at the terminal 6 is given by:

A Device for the Measurement of Pyro-electric Polarization of Crystals

$$V_2 = \frac{i_o R_2 \bar{\eta}}{d_2} \cdot \frac{\mu R_2}{R_i + R_2 + \mu R_2} \qquad (6)$$

in which μ is the amplification coefficient of the valve. It is clear from Eqs (5) and (6) that if the valve Λ_1 is followed by a filter which will pass a signal at a frequency ω_o but not at $2\omega_o$, then the potential difference of the output of such a device will be proportional to V_o.

In the instrument described, the membrane was of dumalumin, 9 mm in radius with a natural frequency of 960 c.p.s. and $\vartheta = 0.196$. The mean displacements of the membrane were 0.44×10^{-9} cm and 0.36×10^{-9} cm at ω_o and $2\omega_o$, respectively. The complete circuit diagram of the instrument is shown in Figure 2. The scheme can be used to measure voltages of the order of 25×10^{-3} V with an input capacity of 70.6 μμF. The time constant is limited by the insulation of the instrument. In the instrument now

A Device for the Measurement of Pyro-electric Polarization of Crystals

described, the specific resistance of the insulator was 10^{16} Ωcm. The instrument was used to measure the pyro-electric constant of tourmaline and ethylene diamine tartrate. Crystalline plates were placed in a crystal holder made of teflon; these were placed in an air thermostat with a dryer and a water jacket. The temperature in the thermostat was kept constant to within ± 0.01 °C. The temperature was measured by means of a low inertia semiconductor microthermometer of type MT-52. It was found that the pyro-electric constant of tourmaline was between 1.26 and 1.28 CGSE/cm^2 per degree when the temperature varied by 0.1, 0.2 and 0.3 °C, from the temperature of 20.6 °C. The average value for ethylene diamine tartrate at the same temperature was 2.52 CGSE/cm^2 per degree. Academician A.V. Shubnikov is thanked for his interest and encouragement.

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A Device for the Measurement of Pyro-electric Polarization of Crystals

There are 4 figures and 4 references, 2 of which are Soviet (1 translated from English), 1 English and 1 German.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography of the Ac.Sc.USSR)

SUBMITTED: December 19, 1956

Card 7/7

70-3-3-32/36

AUTHORS: Sil'vestrova, I.M., Aleksandrov, K.S. and Chumakov, A.A.

TITLE: The Growth of Crystals of Terpene Monohydrate and Their Elastic and Piezoelectric Properties (Vyrashchivaniye kristallov terpin-monogidrata i ikh uprugiye i p'yezo-elektricheskiye svoystva)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 3, pp 386 - 387 (USSR).

ABSTRACT: Crystals of cis-terpene monohydrate $[C_{10}H_{18}(OH)_2.H_2O]$ have mp. 116 °C and $d_{obs.} = 1.11$ g/cm^3. A water thermostat of Heppler's type was used to grow crystals of 30 ÷ 50 g from a solution in alcohol and acetone cooled 1 - 2 ° below the saturation point. Crystals (morphologically) belong to the class 2.m (rhombopyramidal). The principal dielectric constants at 1 Mc/s and a field of 5-10 V/cm were found to be $e_{11} = 2.6 \pm 0.05$, $e_{22} = 2.8 \pm 0.05$, $e_{33} = 3.2 \pm 0.05$. The elastic moduli c_{ik} were measured by an impulsive ultrasonic method as (x 10^{10} dynes/cm^2)

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70-3-3-32/36

The Growth of Crystals of Terpene Monohydrate and Their Elastic and Piezoelectric Properties

$c_{11} = 12.5 \pm 0.2$, $c_{44} = 2.43 \pm 0.05$ $c_{23} = 4.10 \pm 0.2$
$c_{22} = 9.9 \pm 0.2$, $c_{55} = 2.23 \pm 0.04$ $c_{31} = 6.20 \pm 0.3$
$c_{33} = 15.3 \pm 0.2$, $c_{66} = 3.46 \pm 0.06$ $c_{12} = 3.80 \pm 0.4$

For the piezoelectric properties the resonant and anti-resonant oscillation frequencies of 6 blocks or plates were measured giving (in cgsu X 10^{-8}) $d_{31} = -6.5 \pm 0.1$
$d_{32} = 10.6 \pm 0.1$, $d_{33} = 6.6 \pm 0.3$, $d_{15} = 13.0 \pm 0.2$,
$d_{24} = 17.3 \pm 0.2$.

There are 1 figure and 2 references, 1 Soviet and 1 German.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography, Ac.Sc.USSR)

SUBMITTED: December 3, 1957

Card 2/2

SOV/70-3-4-12/26

AUTHORS: Chumakov, A.A., Sil'vestrova, I.M. and Aleksandrov, K.S.

TITLE: Growing Crystals of l-ramnose Monohydrate and the Investigation of their Dielectric, Piezoelectric, and Elastic Properties (Vyrashchivaniye kristallov l-ramnozy monogidrata i issledovaniye ikh dielektricheskikh, p'yezoelektricheskikh i uprugikh svoystv)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 4, pp 480-482 (USSR)

ABSTRACT: Crystals of l-ramnose monohydrate, which belong to the dihedral axial class of the monoclinic system, weighing up to 285 g were successfully grown from aqueous solution in the interval 30-60° with 1-3 °C super-cooling and with rapid rotation (200-500 rpm) of the crystal. The m.p. is 126 °C and the density 1.471 g/cm³. The dielectric constants at 1 Mc/s and 10 V/cm were found by Q-meter to be $e_{11} = 2.6$, $e_{22} = 2.9$, $e_{33} = 3.0$, $e_{13} = 0.15$. The piezoelectric moduli (Class 2) were found to be (in c.g.s.u. X 10^{-8}):

$d_{21} = + 6.0$, $d_{23} = -13.7$, $d_{25} = - 16.1$, $d_{22} = - 8.7$,
$d_{14} = - 11.8$, $d_{16} = + 4.8$, $d_{34} = - 19.8$, $d_{36} = + 3.8$.

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SOV/70-3-4-12/26

Growing Crystals of l-ramnose Monohydrate and the Investigation of their Dielectric, Piezoelectric and Elastic Properties

The greatest electromechanical coupling coefficient, 11.7%, occurs for compressional-extensional oscillations along the z-axis (piezoelectric modulus d_{23}). This material can work as a transmitter of hydrostatic pressure with a piezomodulus of $d_h = -16.4 \times 10^{-8}$ c.g.s.u. The moduli of elasticity were determined by an ultrasonic impulse method and the velocities of u/s waves in six directions - [100], [010], [001], [110], [101], [011] - were measured. The moduli c_{ik}. 10^{10} dynes/cm^2 at 20 - 22 °C are (tabulated against ik): (11) 3.82; (22) 2.19; (33) 1.98; (44) 0.537; (55) 0.502; (66) 0.911; (23) 0.888; (31) 1.66; (12) 1.60; (15) -0.03; (25) 0.122; (35) -0.118; (46) 0.022.

Resonance and impulse methods agree fairly well.

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Growing Crystals of (-ramnose Monohydrate and the Investigation of their Dielectric, Piezoelectric and Elastic Properties

There are 2 figures, 1 table and 7 references, 6 of which are Soviet and 1 German.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography, AS USSR)

SUBMITTED: February 14, 1958

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